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EXAMINER

STEVENOSKY, MARK J

ART UNIT

PAPER NUMBER

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MAIL DATE

DELIVERY MODE

03/25/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

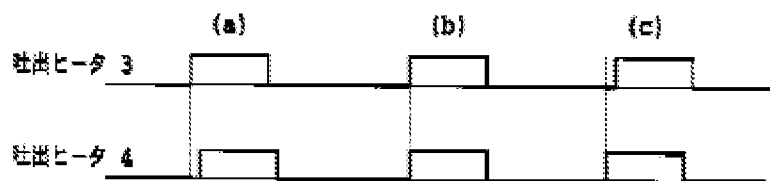
Response to Arguments

Applicant has argued that the Examiner has to identify any specific teaching or suggestion in support of the obviousness rejection. The examiner respectfully disagrees with that assertion for at least the following reasons.

First, the claim language provided by applicant is as follows: "... shifted in a time of the range **within** 20% of supply time ...". Additionally, applicant has argued that "...delivered with a delay of **up to** 20% of the supply time". These broad recitations encompass a delay time of zero. Therefore, the language applicant has provided does not preclude prior art with two heaters firing at the same time, as a delay time of zero would fall within the scope of the invention **as claimed**. Furthermore, the term "supply time" is a broad recitation and could be the width of the applied pulse, or the period between pulses.

Applicant asserts "The Examiner indeed has even acknowledged that there is no teaching or suggestion the primary or secondary references concerning the specifically claimed preferable maximum difference in ejection timings in order to achieve the advantages of the present invention." This is an misrepresentation of the language presented in the office action dated 7/17/2007. The examiner asserted there was no **explicit** disclosure of 20%, however, given the teachings and suggestions provided by Kazuyuki it would have been obvious to arrive at such.

Applicant asserts that the delay in timing solves many problems in the art, one of which would be to make it "possible to discharge liquid in a desired direction from the discharge hole [0021]." The prior art cited aims to solve the same problem by the same means, to alter the delay in timing between two energization elements (heaters 3 and 4). The following is an excerpt from the Detailed Description of Kazuyuki: "Moreover, if a heater 3 energizes somewhat later than a heater 4 ... the discharge direction of ink will shift to the left". The main evidence examiner has provided in the previous office action is the timing diagrams as shown in prior art. In the figure below, the timing diagram for heaters 3 and 4 is disclosed. It can easily be seen that there is **some** delay between the firing of heaters 3 and 4 and there is also an instance where they are fired simultaneously (b). Additionally, Kazuyuki also teaches a random number generator which can alter the discharge times at random [0073] and presumably, at one point or another, arrive at a combination of heater pulses within the 20% threshold.



In the opinion of the examiner, there is overwhelming evidence as to why it would have been obvious to arrive at a 20% delay time. There is a recognized problem in the control of ejection trajectory as both Kazuyuki and applicant have acknowledged. There are a finite number of identified predictable solutions to solve this problem, in that the direction can be shifted right or left based on the time delay, as shown in Kazuyuki. One

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of ordinary skill in the art could have pursued the known potential options with a reasonable expectation of success. Kazuyuki has found that the ejection direction can be controlled by altering the delay of heater pulses. Kazuyuki has provided the method to arrive at the conclusion and applicant has merely utilized routine experimentation to arrive at a preferred value with which to operate.

Therefore, it would have been obvious to try and would only require routine skill in the art through routine experimentation to arrive a fixed threshold at which a preferred ejection occurs.

Specification

1. The disclosure is objected to because of the following informalities: character reference 22 is referred to as “head cartridge 22” as well as “loading portion 22” on separate occasions.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

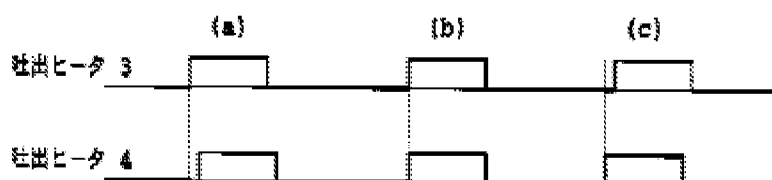
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims **1-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuyuki (JP 2001-105584).

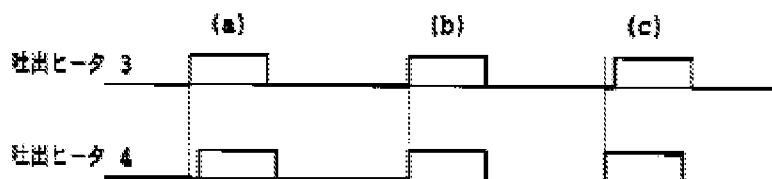
Regarding **claims 1 and 4**, Kazuyuki discloses a liquid discharge apparatus [0029; Figure 1] comprising discharge control means [0037] including: a liquid chamber for storing liquid [Figures 3 and 4; although there is not a reference character specifically assigned to the liquid chamber, it can be clearly seen in the mentioned figures as the chamber which has above it heaters 3 and 4, as well as delivery 5 directly below]; two pressure generating elements or more provided at the liquid chamber [Figures 3 and 4; heaters 3 and 4; 0045-0046], and serving to press liquid stored within the liquid chamber [0045-0049]; and discharge holes [delivery 5] for discharging the liquid which has been pressed by the respective pressure generating elements in the state of droplet from the liquid chamber to control supply timings and supply times of energies to the respective pressure generating elements to control discharge angle when the droplet is discharged from the discharge hole [0045-0049]. Kazuyuki fails to *explicitly* disclose a 20% supply time as detailed in the claimed limitation.

However, Kazuyuki teaches that the angle of ejection can be altered by changing the time at which a second heater fires after a first heater [0054-0055], thus the discharge direction of ink is controllable by shifting slight energization initiation timing of two heaters 3 and 4 [0054]. In addition, referencing Figure 5, the top timing diagram is for heater 3 whereas the lower diagram is for heater 4. Second heater 4 is activated a short period of time afterward.



Thus, it would have required *only* routine skill in the art by means of routine experimentation to arrive at a 20% supply time, in view of Kazuyuki. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Kazuyuki, as doing so would provide straight flight of ink [0052].

Regarding **claims 2 and 5**, Kazuyuki fails to *explicitly* disclose a range of 7.5% to 20%. However, Kazuyuki teaches that the angle of ejection can be altered by changing the time at which a second heater fires after a first heater [0054-0055], thus the discharge direction of ink is controllable by shifting slight energization initiation timing of two heaters 3 and 4 [0054]. In addition, referencing Figure 5, the top timing diagram is for heater 3 whereas the lower diagram is for heater 4. Second heater 4 is activated a short period of time afterward.



Thus, it would have required *only* routine skill in the art by means of routine experimentation to arrive at a 7.5% to 20% supply time, in view of Kazuyuki. Thus, it

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would have been obvious to one of ordinary skill in the art at the time of invention to modify Kazuyuki, as doing so would provide straight flight of ink [0052].

Regarding **claims 3 and 6**, Kazuyuki discloses nozzles in substantially parallel form [Figure 7].

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark John Stevenosky, Jr. whose telephone number is (571)270-1336. The examiner can normally be reached on Monday - Friday, 9AM - 5:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark John Stevenosky, Jr./
Examiner, Art Unit 2853

Mark John Stevenosky, Jr.
Examiner
Art Unit 2853

3/17/2008

/Manish S. Shah/
Primary Examiner, Art Unit 2853